REMARKS

Claim 1 is amended to provide further definition for the meaning of "impregnation" in the present context. New Claim 10 uses the transitional phrase "consisting of" to define the scope of that claim, which recites the elements currently set forth in Claim 1. Claims 1-3 and 5-10 remain, with no claim previously allowed.

Examiner Chang is thanked for the telephone interview conducted with the undersigned. During that interview the undersigned said that the Applicant intended to file a claim using the "consisting of" transitional phrase, in addition to maintaining Claim 1 with the "consisting essentially of" transitional phrase. The Examiner agree in principle that a claim having the "consisting of " transitional phrase would not be anticipated by a reference disclosing elements in addition to those of the claim. The undersigned also stated that Claim 1 and new Claim 10 would contain the wording --so as to imbue the nonwoven fiber material with the thermoplastic resin--, thereby amplifying the meaning of "impregnated" in those claims. *Mamish* (US 5,227,225) was discussed during the interview, but no agreement was reached regarding novelty or patentability over that reference.

Turning first to the issue of novelty over *Mamish*, new Claim 10 defines the present invention as "consisting of" the elements recited in that claim. Those elements are an adhesive tape support, and an adhesive coating adjacent to the tape support at least one side thereof, with the nonwoven fiber material having a basis weight no more than the amount specified in the claim. The nonwoven fiber material is impregnated by dipping or spraying with the thermoplastic resin, with a basis weight of impregnation within the range specified in that claim.

The transitional phrase "consisting of" excludes any element, step, or ingredient not specified in the claim. MPEP 2111.03. *Mamish* discloses a masking tape consisting essentially of four distinct layers, namely, an outer layer of high density polyethylene, an inner layer of low density polyethylene, a nonwoven cloth, and a pressure-sensitive adhesive layer. Please see column 6, lines 37-42 of *Mamish.* That reference requires a two-layer backing consisting essentially of an HDPE outer layer and an LDPE inner layer (column 2, lines 30-33), and points out that the two-layer backing may be formed by coextrusion coating it onto the layer of nonwoven cloth (column 2, lines 34-35). A further example of the two-layer backing in *Mamish* appears at column 4, lines 54-58, which point out that the two-layer backing —consisting of the LDPE outer layer and the HDPE inner layer — is coextruded onto the nonwoven cloth layer. Thus, although *Mamish* asserts at column 1, lines 56 and 57 "that the nonwoven is not present as a discrete layer", that is contradicted by his unequivocal disclosure that the polyolefinic backing layer (disclosed as consisting essentially of *two layers*) coats the surface of the nonwoven cloth "as well as being mechanically bonded or laminated thereto" (column 1, lines 61-62). In other words, the cloth and the two-layer backing are individual layers mechanically attached to each other.

Accordingly, the Applicant submits that *Mamish* discloses a masking tape requiring more than the elements following the transitional phrase "consisting of" in Claim 10. *Mamish*, accordingly, does not anticipate the Applicant's tape as defined in Claim 10.

Turning to Claim 1, using the transitional phrase "consisting essentially of", the Applicant submits that *Mamish* likewise fails to anticipate the combination of elements

defined by that claim. The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps and those do not *materially* effect the basic and novel characteristics of the claimed invention. MPEP 2111.03. The Applicant's specification and remarks in previous responses have made clear that the elements recited in Claim 1 are basic and novel characteristics of the present invention. *Mamish's* four-layer masking tape introduces elements that would materially change the characteristics of the Applicant's invention. Those added elements of *Mamish* include the two-layer backing, the basis weight of impregnation of one to five g/m^2 vs. *Mamish's* effective basis weight of the resin at about 34.9 g/m^2 (please see page 7 of the Applicant's Fourth Response), the Applicant's nonwoven fiber material having a basis weight of not more than 60 g/m^2, and application of the thermoplastic resin impregnated by dipping or spraying so as to imbue the nonwoven fiber material with the thermoplastic resin (vs. coextrusion of the two-layer backing in *Mamish*). Accordingly, the Applicant submits that *Mamish* does not disclose a tape consisting essentially of the elements required by Claim 1.

Considering the technical meaning of "impregnation" in the present context, the Applicant has previously argued that persons of ordinary skill in this art would not consider *Mamish* as teaching impregnation of the cloth by the coated polyolefinic backing layer. In response, the Examiner referred to the statement in *Mamish* that is coated polyolefinic backing layer "will both coat the surface of the cloth and invade its interstices, so that the cloth may be said to be 'embedded' in the backing layer as well as being mechanically bonded or laminated thereto." (column 1, lines 58-62) The Examiner also asserted that the recitation in Claim 1 fails to preclude *Mamish's* teaching,

and suggests that the exact scope of the term "impregnation" in the present invention must be incorporated into Claim 1 so as to establish a clear and distinctive patentable feature of the present invention. During the above-mentioned interview, the Examiner pointed out that any amendment must be supported by the original disclosure.

The Applicant, to address that issue, is amending Claim 1 to state that the nonwoven fiber material is impregnated by dipping or spraying with the thermoplastic resin <u>so as to imbue the nonwoven fiber material with the thermoplastic resin, whereby</u> penetration of the adhesive coating through the nonwoven fiber material is prevented. Support for the term "to imbue" is found from the technical meaning of the German word "imprägnient" in the original German text filed with the present application. An enclosed extract from an online translation for the root word "imprägnierung" shows that the English technical translation is "impregnation" (Attachment 1). A German synonym for "imprägnierung" is "tränkung" (Attachment 2), which means "to imbue", "to saturate", "to water" (Attachment 3).

Please note that these definitions of "imprägnierung" and its synonym "tränkung" do <u>not</u> include "to coat", the step used by *Mamish* to apply his two-layer backing onto the nonwoven material. Thus, although the two-layer backing in *Mamish* is "mechanically bonded or laminated" to the cloth (column 1, line 62) and may invade the interstices of a cloth, that *disclosed* backing does <u>not impregnate</u> the nonwoven fiber material and does <u>not</u> *imbue the nonwoven fiber material with the thermoplastic resin*, requirements of the Applicant's tape as defined in the present claims.

The Examiner also asks for support to the Applicant's argument that "a coating resin with basis weight of one to five g/m^2 would not be sufficient for embedding the

light-weight nonwoven of *Mamish*, and cannot be applied by the coextrusion process described by *Mamish*. The following documents reflect the state of the art concerning the minimum layer thickness which may be obtained by extruding, the only technique disclosed by *Mamish* for forming his two-layer backing material. EP 0 252 388 (Attachment 4) describes apparatus and methods for extruding single and multi-layer resins. Page 2, lines 22-31 of that document describes the difficulties in producing barrier layers with reduced thickness; and page 3, lines 35-40 mention that the therein-disclosed invention enables barrier layers of 0.001 inch (25 μm) to 0.0005 inches (12.5 μm).

Attachment 5, a German-language document entitled "Schichtdicke exakt steuern" and dated 21 October 2003, mentions coextruded three-layer foils with the thickness of 10 to 120 μm. Considering the disclosure in EP '388 (Attachment 4), it cannot be assumed that a thickness of 1/3 of this value would be sufficient for providing a useable barrier layer. (Attachment 5, published later than *Mamish* and after the Applicant's filing date, is nonetheless relevant as showing the state of coextrusion art at a time even later than the present filing date.)

Attachment 6, an abstract of Chinese patent CN 1344616 published in 2002, describes a two-layer polyethylene film from 10-200 microns in total thickness. That layer is produced by coextrusion, followed by blowing to form a cylindrical film.

The minimum layer thickness disclosed by *Mamish* is 1.5 mils (38.1 μm). Notwithstanding that *Mamish's* two-layer backing mechanically bonded or laminated to the nonwoven fiber is <u>not present</u> in the Applicant's tape, one can compare the minimum layer thickness of 38.1 μm disclosed by *Mamish* to the aforementioned prior-art layer

limit of about 10 μm. Using the density values according to *Mamish,* one can calculate a limiting specific weight of 9.58 g/m^2, which cannot be fallen below according to *Mamish.* The present invention claims a basis weight of impregnation of 1-5 g/m^2, which is less than 52% of the value calculated for *Mamish.*

Summarizing the foregoing, the Applicant has shown that imbuing the nonwoven fiber material with thermoplastic resin with a basis weight of impregnation of 1-5 g/m^2 is <u>not disclosed</u> in *Mamish.* Furthermore, that limitation is obtainable only by a method that is <u>not disclosed</u> in *Mamish,* namely, impregnating the fiber material by dipping or spraying with a thermoplastic resin having the requisite basis weight. Accordingly, the resultant article as claimed by the Applicant is not substantially identical, but is both novel and patentably distinct from *Mamish,* and Claims 1 and 10 are novel and patentable over that reference. Likewise, dependent Claims 2, 3, and 5-9 are patentable thereover.

The foregoing is submitted as a complete response to the Office Action identified above. The Applicant respectfully submits that this application is in condition for allowance, and solicits a notice thereof.

Respectfully submitted,

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405633 Einträge
1065472 Anfragen

Suchbegriff: <>

Imprägnierung

Suchen Löschen

Suchtipps

Optionen >>

Legende >>

ENGLISCH		DEUTSCH
Unmittelbare Treffer		
M impregnation [tech.]		die **Imprägnierung**
M waterproofing		die **Imprägnierung**

Grundformen für flektierte Formen – ein Service der Canoo AG:

- Imprägnierung (LEO) - Substantiv/Noun - Imprägnierung (Canoo)

Attachment 1

Suchbegriff: <>

impregnation

Suchen Löschen

Suchtipps

Optionen >>

Legende >>

ENGLISCH	DEUTSCH
Unmittelbare Treffer	
impregnation [biol.]	die Befruchtung
impregnation [tech.]	die Imprägnierung
impregnation [tech.]	die Tränkung
Zusammengesetzte Einträge	
coefficient of **impregnation** - *of roof tiles* [tech.]	der Tränkungswert
preservative **impregnation** [tech.]	die Schutzimprägnierung *Lacke]*
impregnation base paper	das Imprägnierrohpapier

Attachment 2

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tränken

Suchen Löschen

Suchtipps

Optionen >>

Legende >>

ENGLISCH		DEUTSCH
Verben und Verbzusammensetzungen		
to imbue		**tränken**
to saturate		**tränken** | tränkte, getränkt |
to soak		**tränken**
to water		**tränken**

Attachment 3

(2)

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European Patent Office
Office européen des brevets

(11) Publication number: **0 252 388 A1**

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(54) Modular extrusion head, method intermediate product and product.

(57) A modular extrusion head (10) is disclosed including a plurality of cross head die modules (16, 18, 20, 22, 24), each including a flow path for a single resin. Molten resin layers are flowed from the modules onto a stepped mandrel and then along the mandrel and out an extrusion die to form a multi-layer parison. The layers are thin, with a uniform thickness and hole free. The modules are temperature zoned to permit flowing of a low temperature resin to and among the mandrel in contact with a high temperature resin without impairing the properties of the low temperature resin.

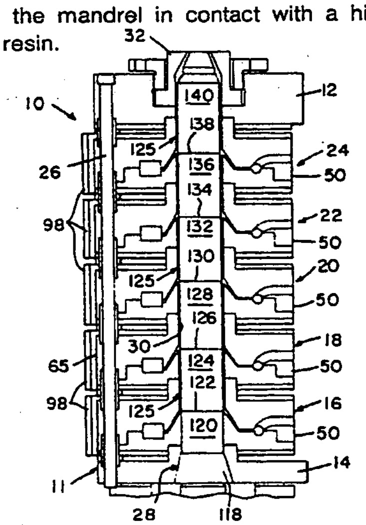

FIG. 1

EP 0 252 388 A1

Attachment 4

MODULAR EXTRUSION HEAD, METHOD INTERMEDIATE PRODUCT AND PRODUCT

FIELD OF THE INVENTION

The invention relates to resin extrusion and particularly to extrusion heads and methods for extrusion of single and multi-layer resin parisons, and an intermediate product and products formed from the parison.

BRIEF DESCRIPTION OF THE PRIOR ART

Commercially available thermoplastic resins are extruded at temperatures specific to the particular resin. In order to maintain the properties of the resin, the flow temperature during extrusion must be within a pre-determined temperature range for the resin. The properties of the resin are degraded when the resin is heated appreciable above its flow range.

Prior extrusion heads are incapable of forming a parison having a layer of undegraded low flow temperature resin adjacent to a layer of a high flow temperature resin where the properties of the low temperature resin would be degraded is the resin were heated to the flow temperature of the high temperature resin. Heat supplied to the head by the high temperature resin raises the temperature of the flow path of the low temperature resin and heats this resin sufficiently to degrade it properties. This limitation in conventional extrusion heads has prevented the manufacture of parisons with adjacent undegraded layers of high and low temperature thermoplastic resin and the manufacture of blow molded and other types of articles from such parisons.

Parisons may be extruded with a barrier resin layer and tie resin layers on either side of the barrier layer for bonding the barrier layer to the surrounding support layers. The barrier resin is considerably more expensive than the support layer resins which, for example, may be polyolefins or polycarbonate. Because of the cost of the tie and barrier layers, the industry has attempted to reduce the thickness of these layers. Successful reduction of layer thickness requires accurate control over the extrusion process to assure each thin layer is of uniform thickness and continuous, that is, free of holes. Holes in a tie layer prevent desired adhesion between the barrier layer and the adjacent structural layer. Holes in the barrier layer destroy the barrier properties of the product formed from the parison. Extrusion of these very thin layers is made difficult by the necessity of eliminating knit lines and preventing heat degradation of the low temperature resins while in the extrusion head.

Co-extrusion heads receive heated, softened and plasticized resins from individual extruders through inlet ports, flow the resin around the mandrel and then on the mandrel through an annular mouth. Successive layers are flowed onto the mandrel. A multi-layer parison is extruded out of the mouth of an extrusion die. The die may be modulated to vary the thickness of the parison as required to assure that the blow molded product has a uniform wall thickness relative to blow ratios.

Conventional co-extrusion heads define flow paths for each resin in an integral assembled head. The positions of the flow paths in the head are fixed and cannot be changed. The heads are not modular. Each flow path must be used at its intended location within the head. Conventional co-extrusion heads flow parison layers on cylindrical, constant diameter mandrels.

In extrusion cross head dies it is conventional to flow the resin first around the mandrel and into an equilibration chamber spaced from the mandrel. Resin flows from this chamber along a generally conical distribution passage to a mouth located axially downstream from the chamber and opening into an extrusion channel at the mandrel. The cross sectional flow area of the distribution passage decreases from the chamber to the mouth, thereby increasing resistance to the flow of the resin and undesirably increasing the temperature of the resin.

SUMMARY OF THE INVENTION

The extrusion head of the invention is modular with a number of like cross head die modules stacked together and confined between two clamp plates. Each die module has a fixed diameter central bore. A stepped mandrel mounted on one plate extends through the bores and has radial inward steps located at die module mouths. The steps increase the flow area of the extrusion channel between the mandrel and the bore to accommodate resin flowing into the channel.

The modular construction of the die module permits use of individual modules to make an extrusion head for forming a mono-layer or multilayer parison with a number of layers as required. The flow paths in the modules may differ to accommodate flow of different types or outputs of resin. The order of the individual modules may be changed without modification of the modules, as may the number of modules.

The modules are separated from each other by annular air spaces. These spaces prevent heat from a module flowing a high temperature resin from raising the temperature of an adjacent module flowing a low temperature resin. In this way, low temperature resins, typically barrier and tie resins, are flowed onto the mandrel at their low optimum flow temperatures without temperature degradation. Heaters on the outer circumferences of the modules supply heat to the modules during start up. In one embodiment copper envelopes on the outside surfaces of the modules facilitate the flow of heat to and from the module flow paths. In another embodiment insulating discs in the center of the air spaces thermally isolate the modules.

The flow path within each module includes a conical distribution passage running from an equilibration chamber to the annular mouth of the module at the mandrel with a uniform flow cross section along its length as the passage extends downstream and radially inwardly toward the mouth. The uniform flow cross section aids in maintaining the resin flowing along the path at the desired flow temperature until it reaches the extrusion channel.

The flow path in each module is compact with a high throughput rate, thus reducing residence time and avoiding resin degradation.

Changeovers of resin material may be made without disassembly of the modules or purging with special purging components.

Each module may be provided with its own temperature control system allowing for temperature zoning and variation within the module according to the need of each resin layer.

The resin layers flowing into the extrusion channel contact other resin layers in the channel to form a moving, intermediate product. The rapid rate the intermediate product flows down the channel and out the mouth of the extrusion head and the insulating properties of the resin layers maintain temperature gradients across the interfaces between the layers until the layers are extruded. Low temperature layers are not heated and degraded by contact with adjacent high temperature layers.

The intermediate product is extruded from the head as a parison. In the event the parison is supplied to a blow machine the parison cools following blow molding to form an article. In tube manufacture, the parison is cooled in a liquid. In film manufacture, the parison is expanded by air and cooled. In sheet manufacture the parison is slit and cooled when passed through chilled rollers.

The modular design of the co-extrusion head has a reduced axial length over conventional heads and high flow rates, thus reducing the residence time for resin within the head and minimizing the risk of resin degradation.

The features of the disclosed extrusion head permit extrusion of parisons with thin, uniform thickness cylindrical and continuous or hole free layers of undegraded resin, particularly expensive tie and barrier resins. The thickness of these layers in a resultant blown product depends upon the modulation of the extrusion die and the blow ratio. In some cases, a blow molded article formed from a multi-layer parison extruded from the disclosed head may have a barrier layer 0.001 inch thick and surrounding continuous tie layers 0.0005 inch thick. 125 μm 25 μm

The invention is primarily useful in extruding a parison for use in blow molding articles, typically liquid and food containers. The invention is also useful in the manufacture of tubing, film, sheeting and injection molded articles.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a sectional view illustrating a first example five-layer modular co-extrusion head according to the invention;

Figure 2 is an enlarged view of Figure 1, partially broken away;

Figure 3 is a sectional view taken along line 3--3 of Figure 2;

Figure 4a is a representational partial cross-sectional view illustrating the flow of resin into and along the extrusion channel of the head;

Figures 4b, 4c, 4d, 4e and 4f are enlarged views of portions of Figure 4a;

Figure 5 is an enlarged partial sectional view of the intermediate product of Figures 4b to 4f;

Figure 6 is a diagrammatic view showing the geometry of a portion of a module flow path;

Figure 7 is a sectional view of a second embodiment extrusion head similar to the head of Figures 1 through 3;

(3)

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LineMaster-Software

Schichtdicke exakt steuern

21.10.2003

Mit Hilfe der LineMaster-Software von Maguire konnte Coextruded Film Technologies (CFT) die Konstanz der Schichtdicke und damit die Qualität seiner coextrudierten Dreischichtfolien erheblich verbessern.

Durch Steuern des Extruderaustrags mit Hilfe der LineMaster-Software von Maguire, Aston/USA, lassen sich konstante Schichtdickenverhältnisse einhalten und Folienrollen mit von Wickel zu Wickel praktisch identischem Gewicht produzieren. Diese Erfahrung machte beispielsweise der Folienhersteller CFT. Dank der exakten Schichtdickensteuerung haben Folien aus diesem Haus gleichbleibende Heißsiegel- und mechanische Eigenschaften. In der hier betriebenen Blasformlinie speisen drei 55-mm-Extruder ein 300-mm-Werzeug. Die Anlage ist auf die Produktion von Dreischichtfolie mit 10 bis 120 µm Gesamtdicke bei gleicher Schichtdicke ausgelegt und hat eine monatliche Produktionsleistung von rund 70 t. Das Extrusion Control Network (ebenfalls von Maguiere) regelt die Schichtdicke durch Überwachen des Gewichts des pro Zeiteinheit zugeführten Rohstoffs und Einstellen des Extruderdurchsatzes anhand der so ermittelten Daten. Bereits mit der Installation dieses Systems wurden Verbesserungen in der Produktqualität erzielt und Rohmaterial eingespart.
Mit der LineMaster-Software wurde die Steuerung jetzt nochmals verfeinert und ein neues Niveau an Prozessautomation erreicht. Zusätzlich zur bestehenden Steuerung stimmt diese sowohl den Extruderdurchsatz als auch die Liniengeschwindigkeit auf die gewünschte Produktqualität ab. Neben der Koordination aller Mischer in der Extrusionslinie vereinfacht die Software durch Download von Rezepturen und Einstellungen die Umrüstung bei Produktwechsel. Außerdem liefert sie umfassende Daten über den Rohstoffverbrauch für die Materialdisposition, Kostenkalkulation und Qualitätssicherung.

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Attachment 5

(4)

Gaseous antirust film and its production process

Veröffentlichungsnr. (Sek.)	CN1344616
Veröffentlichungsdatum :	2002-04-17
Erfinder :	AN CHENGQIANG (CN); BAI FANG (CN); DING GUOZHEN (CN)
Anmelder :	SHENYANG ANTIRUST PACKING MATE (CN)
Veröffentlichungsnummer :	CN1344616
Aktenzeichen: (EPIDOS-INPADOC-normiert)	CN20010128199 20010925
Prioritätsaktenzeichen: (EPIDOS-INPADOC-normiert)	CN20010128199 20010925
Klassifikationssymbol (IPC) :	B32B27/30
Klassifikationssymbol (EC) :	
Korrespondierende Patentschriften	

Bibliographische Daten

The gaseous antirust film consists of two layers. The outer layer is linear low density polyethylene or superlow density polyethylene or their combination. The inner layer is mixture layer of low density polyethylene, gasified corrosion retardant VCI and stuffing and made through mixing, extrusion and blowing. The film is 10-200 microns in total thickness, the outer layer is 10-40 % thick of the total thickness and the inner layer 60-90 %. It is produced through the main steps of: selection of the outer layer resin, pre-treatment of the stuffing, the preparation of VCI material, selection of the inner layer resin, mixing with VCI material, feeding the mixed inner material to material bin of the extruder, feeding the outer layer polyethylene to outer material bin, extrusion and blowing at 140-190 deg.c to form cylindrical film, wind cooling and winding the produced gaseous antirust film. The film may be used widely in antirust packing of metal product.

Attachment 6